



The livelihoods approach and management of small-scale fisheries

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Abstract

An approach to poverty reduction in low-income countries known as the ‘sustainable livelihoods approach’ is applied to understanding the strategies of artisanal fisherfolk confronted by fluctuating fisheries resources. The livelihood approach is explained, and the insights it provides into conventional fisheries management policies in developing countries are explored. It is argued that both state-led management and some of the newer, community or territorial use-rights approaches, if predicated on an incomplete understanding of livelihoods, can result in management directives incompatible with both resource conservation and the social and economic goals of management. © 2001 Elsevier Science Ltd. All rights reserved.

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1. Introduction

Within fisheries management and development policy, the importance of sustaining small-scale fisheries is being increasingly recognised [1,2]. In 1990, an estimated 28.5 million people made all or part of their living from fish production and capture; the vast majority (around 24 million) were small-scale or artisanal fisherfolk in Asia.¹ Over 120 million people were involved in activities relating directly to capture, processing and sale of fish; 95% of them are in developing countries [4]. The continued expansion of artisanal fisheries has taken place despite long-standing policy support for industrialisation of fisheries and neglect of the small-scale sector [5,6]. The expansion of both industrialised and artisanal fishing has, however, prompted fears of a world-wide crisis in fisheries [7,8], with resource depletion threatening livelihoods and, through reduced per-

capita supply, the nutritional status of low-income households in developing countries [9, p. 48].

Most studies of small-scale fisheries in developing countries in the last 25 years have tended to emphasise small-scale fisherfolks’ resource dependence and the open-access nature of fisheries that together lead to resource degradation, poverty and marginalisation. Small-scale fisheries are frequently characterised as “the occupation of last resort” and fisherfolk as “the poorest of the poor” [1,10–13]. The solutions advocated to the problems of poverty and resource degradation have centred on the necessity to make small-scale fisheries more economically efficient, while finding means to conserve fish stocks through a combination of management to limit access and incentives for current participants to leave the fishery. These policy prescriptions have typically been based on fisheries-sector analyses that have not addressed the role of fisheries in the wider coastal economy. They are also based on an ‘equilibrium’ view of fisheries resources, where fishing capacity is matched to the productive capacity of the resource, with the objective of achieving a maximum sustainable yield (or related targets that include economic and social objectives).

The prevalent sectoral and equilibrium views are challenged by empirical observation. The limitations of equilibrium models in fisheries management have been repeatedly pointed out [14–16] but the assumption of an

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¹ We define small scale-fishers as those operating from the shore or from small fishing vessels in coastal or inland waters. We recognise that this is a very vague definition, but, as will be seen later, more precise definitions that invoke the nature of production objectives, technological sophistication, fleet ownership structure and community connections are problematic (also see [3] for review).

underlying static bio-economic equilibrium, where catching capacity can be matched to resource productivity, continues to be the dominant ‘world view’ in fisheries [17]. It has also often been observed that small-scale fishers respond dynamically to resource fluctuations [13,18–20] but there has been no systematic attempt to build approaches to fisheries management that take these adaptations into account. It is the aim of this paper to bring to the fore the adaptive responses of small-scale fishers to resource fluctuations and other shocks and uncertainties, so that the search for creative solutions to current fisheries management problems can draw on an understanding of the adaptive strategies of fisherfolk themselves.

This paper suggests that a framework known as the livelihoods approach can help bring a fuller understanding of fisherfolk’s adaptive strategies into the policy arena of small-scale fisheries management in low income countries. The livelihoods approach [21,22] is increasingly being used by many development agencies and NGOs in order to achieve a better understanding of natural resource management systems [23]. Its chief point of departure is to avoid undue preoccupation with a particular component of individual or family livelihood strategies, in this instance fishing,² to the neglect of other components that make their own demands on the resources available to the household [25,26].

The livelihoods approach seeks to improve rural development policy and practice by recognising the seasonal and cyclical complexity of livelihood strategies, helping to remove access constraints to assets and activities that complement existing patterns, and identifying ways of making livelihoods as a whole more able to cope with adverse trends or sudden shocks. A fundamental precept of the approach is that it seeks “to identify what the poor have rather than what they do not have” and “[to] strengthen people’s own inventive solutions, rather than substitute for, block or undermine them” [27, p. 1].

The livelihoods approach centres on the links between individual or household assets, the activities in which households can engage with a given asset profile, and the mediating processes (institutions, regulations etc.) that govern access to assets and to alternative activities. The concepts and methods of livelihoods analysis

have seldom been applied to fisheries.³ This paper proposes that livelihoods analysis could provide a means by which to better understand the nature of small-scale fishery production systems, and to identify appropriate entry-points for development intervention or policy support for poverty reduction in fishing communities.

The paper proceeds, first, by setting out in more detail the livelihoods approach as a guide to poverty reduction policies in low-income developing countries. Second, it considers past and current approaches to fisheries management in developing countries and links these to the insights that are indicated by taking a livelihoods perspective. Finally, the paper sets out some preliminary conclusions about the management of artisanal fisheries arising from examination of the literature on small-scale fisheries from a livelihoods perspective.

2. The livelihoods approach

The livelihoods approach has its origins partly in a literature concerned with understanding the differential capability of rural families to cope with crises such as droughts, floods, or plant and animal pests and diseases. This literature focuses attention on the assets of rural people, and how different patterns of asset holding (land, stock, food stores, savings etc.) can make big differences to the ability of families to withstand shocks [28]. This set of concerns also links to the concept of vulnerability; defined as a high degree of exposure to risk, shocks and stress and proneness to food insecurity [29,30]. Vulnerability has the dual aspect of external threats to livelihood security due to risk factors such as climate, markets or sudden disaster; and internal coping capability determined by assets, food stores, support from kin or community, or government safety net policies.

The approach also borrows ideas from an ecological literature concerned with the sustainability of ecosystems or agroecological systems [31–33]. Here, sustainability is defined as “the ability of a system to maintain productivity in spite of a major disturbance, such as is caused by intensive stress or a large perturbation” [32]. The concepts of resilience and sensitivity as livelihood attributes also originate in this context [34]. Resilience refers to the ability of an ecological or livelihood system to “bounce back” from stress or shocks; while sensitivity refers to the magnitude of a system’s response to an external disturbance. It follows from these ideas that the most robust livelihood system is one displaying high

² The significance of this sectoral preoccupation is illustrated even in Bailey’s classic study of fisheries in San Miguel Bay [24]. He recorded a high proportion of full-time fishers, but admitted, “because the primary interest of the project was on fishing, it concentrated on communities whose residents were primarily fishermen. Several isolated coastal communities... had a higher concentration of part-time fishermen/farmers than elsewhere around the Bay, but were not included in the list of communities to be surveyed partly for this very reason” [23, p. 11].

³ The first major fisheries development and management project to explicitly adopt this framework is the Sustainable Fisheries Livelihoods Programme in West Africa (1999–2004), funded by DFID and implemented by FAO (<http://www.fao.org/fi/projects/sflp/index.html>). It involves 25 countries, within which 7 million people are directly dependent on freshwater and marine resources.

resilience and low sensitivity; while the most vulnerable displays low resilience and high sensitivity. These ideas are relevant to fishery-based livelihoods, as will become apparent in due course.

The concept of ‘a livelihood’ seeks to bring together the critical factors that affect the vulnerability or strength of individual or family survival strategies. These are thought to comprise, chiefly, the assets possessed by people, the activities in which they engage in order to generate an adequate standard of living and to satisfy other goals such as risk reduction, and the factors that facilitate or inhibit different people from gaining access to assets and activities. These considerations result in the following definition of a livelihood [35, p. 10]:

A livelihood comprises the assets (natural, physical, human, financial and social capital), the activities, and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household.

The livelihoods approach is typically set out in the form of a framework that brings together the principal components that are thought to comply with the livelihoods definition, as well as demonstrating the interactions between them. There are many different diagrammatic representations of this framework [21,22,36]. Here, the framework is summarised in tabular form (Table 1).

The reference social scope of this framework is typically considered to be the extended household, including members who are away from home but send remittances back to the resident homestead. The starting point of the framework are the assets owned, controlled, claimed, or in some other means accessed by the household (column A in Table 1). The livelihoods framework recognises five main asset categories, comprising physical capital (sometimes also called produced capital or economic capital); natural capital (land, trees, fish stocks etc); human capital (people, education and health); financial capital (savings, credit); and social capital (kinship networks, associations).⁴

Access to both assets and activities is enabled or hindered by the policy and institutional context of livelihoods, including social relations, institutions and organisations (column B). It is also affected by external factors, sometimes referred to as the vulnerability context, comprising trends and shocks that are outside the control of the household (column C). Assets permit

Table 1. A framework for micro policy analysis of rural livelihoods (modified from Ellis, 2000, p. 30 [35])

A	B	C	D	E	F
Livelihood platform <i>Assets</i> Natural capital Physical capital Human capital Financial capital Social capital	Access modified by <i>Social relations</i> Gender Class Age Ethnicity <i>Institutions</i> Rules & customs Land and sea tenure Markets in practice <i>Organisations</i> Associations NGOs Local admin State agencies	In context of <i>Trends</i> Population Migration Technological change Relative prices Macro policy National econ trends World econ trends <i>Shocks</i> Storms Recruitment failures Diseases Civil war	Resulting in Livelihood strategies	Composed of <i>NR based activities</i> Fishing Cultivation (food) Cultivation (non-food) Livestock Nonfarm NR <i>Non-NR based</i> Rural trade Other services Rural manufacture Remittances Other transfers	With effects on <i>Livelihood security</i> Income level Income stability Seasonality Degrees of risk <i>Env. sustainability</i> Soils & land quality Water Fish stocks Forests Biodiversity

⁴The capital assets approach is also used in environmental economics, where a sixth type of asset—cultural capital—is sometimes distinguished and defined as “the specific behaviours, values and knowledge transmitted among and between members of a population” [38]. In the fisheries management context, this can refer to a ‘world view’ that may include a resource conservation ethic.

livelihood strategies to be constructed, and these are composed of a portfolio of activities, some of which may be natural resource based and others not so (column E). Finally, this framework points to outcomes of livelihood strategies, distinguished here between livelihood security effects and environmental sustainability effects (column F).

The livelihoods of artisanal fisherfolk are readily described by this type of framework. In this instance, key assets are fishing gears (boats and nets), although many artisanal fishers may also possess land and combine fishing with farming [20]. The policy and institutional context of artisanal fishing includes, but is not limited to, the role of state regulations and 'community' based rules that affect access to resources. Social relations can also determine who has access to fishing opportunities (e.g. the ethnicity of fishing families may differ from other families in coastal communities, and roles within fishing activities are often strongly gender-differentiated). Fishing families are no less prone than other rural dwellers to adverse events and trends, with natural fluctuations in fish stocks being especially critical for them. Finally, fishing families often engage in diverse activities in order to achieve livelihood security—an important attribute that we will return to in the context of fisheries management.

The livelihoods approach is utilised in different ways, according to the goal of the study or programme. In development practice, it is being used as a 'process' tool to enable participants in development programmes to identify key constraints and opportunities for development intervention [23]. The livelihoods framework also forms the basis for recent policy-relevant empirical research that seeks to capture the cross-sectoral nature of rural people's income-generating and subsistence activities [37].⁵ In this paper, we are using the livelihoods approach as a conceptual tool to re-examine past strategies in fisheries management and development from a perspective different to the more usual sectoral analyses. The remaining sections of this paper attempt a re-examination of the literature on small-scale fisheries in the light of our preliminary experiences with the application of the livelihoods approach.

⁵We have developed a livelihoods research methodology that combines qualitative and quantitative research methods drawn from a range of disciplines and are currently conducting research, in co-operation with national research agencies and NGOs, to capture a range of rural peoples' experiences in over 1200 households from 40 villages in five countries. Our study sites in four of these countries—Indonesia, Kenya, Malawi and Uganda—include 14 villages where fishing is a significant income-generating activity. The research is funded by UK DFID (see 'Acknowledgements') and details are available from a project website (<http://www.uea.ac.uk/dev/faculty/allison.shtml>).

3. Re-examining small-scale fisheries using the livelihoods framework

Starting from the premise that small-scale fisheries are prone to uncertainty, and that uncertainty of supply (inability to identify a stable biological yield function) is a major cause of fisheries management failure [39], we examine livelihood adaptations to uncertainty. A literature review of adaptations to fishery resource fluctuations (Table 2) reveals a range of livelihood strategies and responses at individual, household and community level. At the level of the individual fisher or fishing enterprise, these can be characterised as flexibility within fisheries (targeting different species according to availability), geographical mobility and livelihood diversification. Diversified livelihoods are also a feature of household strategies, with members of fishing households often being involved in different economic sectors to smooth the effects of resource variations. A variety of intra-household responses are also evident, such as allocation of family labour in time of need, or acceptance of income variation and modification of consumption patterns.

Individual and household livelihood adaptability is sustained by enabling institutions. Outsiders can access village-based fishing territories in times of their need, or when there are local surpluses, often in exchange for an access fee. Reciprocal access agreements, rather than exclusive territoriality, seem to be common features of indigenous 'community-based' management systems. Flexible financial mechanisms at local level recognise the inherent variability of fishing. Permeable barriers to entry allow those in need of a 'safety net' access to the fishery, while there is recognition of the importance of ease of exit from the fishery in times of resource scarcity. What may appear from a simple count of fishing boats or number of fishers to be excess fishing capacity may actually be an adaptation to maximise catches in periods of abundance, with the apparent 'overcapacity' not actually being utilised in periods of scarcity.

While recognising that such adaptations may be a function of a particular set of circumstances and should not be generalised, collectively they do provide challenges to many of the fundamental tenets of previous fisheries management and development approaches, as is indicated below.

3.1. Scientific management and modernisation policies

In common with other natural resource management traditions, orthodox fisheries management in low-income countries has focused on raising incomes by increasing the efficiency of fishing effort [5,6]. At the same time, the threat of depletion of the resource due to over-fishing has tended to be approached utilising conventional top-down fisheries management policies,

Table 2

Strategies and responses to fluctuating resource availability employed by individuals, households and communities involved in small-scale fishing. Examples are drawn from both individual case-studies and from regional reviews^a

Fishery	Strategies and responses
Reefs and atolls, Palau, Micronesia [1]	Fishing in inland lagoons limited to when bad weather prevents fishing in the open sea Flexible redistribution of fishing rights among neighbouring municipalities, according to needs and surpluses Access, in times of local scarcity, to neighbouring community-controlled fishing grounds in exchange for part of the catch
South Pacific island fisheries [2]	Land and sea tenure are integrated conceptually and in practice Resource access and management 'traditions' are highly adaptive, access rights are socially negotiated and frequently redistributed based on principles of equity and reciprocity Individual and household occupational strategies are diverse
Artisanal fisheries for small pelagic species, West Java, Indonesia [3]	On the South Java Coast individuals switch between rice-farming, tree-crop farming and fishing in response to seasonal and inter-annual variations in fish availability Full-time fishers from the north coast (Java Sea) villages track seasonal and spatial variations in fish stock availability by long-shore and inter-island migrations
Ansa Chambok, Great Lake (Tonle Sap) area, NW Cambodia [4]	Livelihoods are sustained by use of both private and common property, including fisheries resources, with intra-household division of labour to optimise complementary livelihood activities. Production activities in one environment are subsidised by inputs supplied by other environments
Canoe fishery, Southern Bahia, NE Brazil [5]	Maintenance of extensive personal networks ('godparents') extends flexibility of fishing opportunities into territories otherwise exclusively used and claimed by single villages
Thau Lagoon, Languedoc-Roussillon, France [6]	Flexibility maintained by diversification, recourse to family labour and 'over-investment' to seize opportunities presented by good catches
Danish small-scale fisheries [7]	Switching between different target species, gear types and fishing areas retains flexibility Income uncertainties buffered by supplier credits Families are willing to reduce their levels of spending or to earn supplementary incomes outside fishing Fishers are able to mobilise cheap or unpaid assistance within the fishing enterprise in times of need
Artisanal Fisheries, Galicia, NE Spain [8]	Diverse pattern of fishing activities with respect to the species exploited, location of fishing grounds and gear used Seasonal fishing supplements incomes of a range of people—e.g. retired persons, taxi drivers, shopkeepers, the unemployed
Subsistence fisheries of the Cree, Northern Canada [9]	No rigid territorial system, thus allowing greater flexibility in catch distribution and maximising the yield
Lake Victoria, Kenya [10]	Gear limited to small units to maintain mobility "Fishing and farming [and livestock herding] have become inextricably linked over many generations in the overall objective of achieving household nutritional security ... In a typical year, oscillations occur between the components of this tri-economy"
African inland fisheries [11]	De facto community-based management regulations are designed to cope with fishery fluctuations by enabling short-term mobility into (and back out) of fisheries Fishers' livelihoods can either include a diversity of income-generating activities (part-time fishers), or extensive geographical mobility (full-time migrant fishers) Households in lake or river-side villages are seldom if ever dependent solely on fisheries for income and nutritional security

^a Sources:

- [1] Johannes RE. Traditional marine conservation methods in Oceania and their demise. *Annual Review of Ecology and Systematics* 1978;9:349–364.
- [2] Ruddle K, Hviding E, Johannes RE. Marine resources management in the context of customary tenure. *Marine Resource Economics* 1992;7:249–273.
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- [7] Vestergaard T. Social adaptations to a fluctuating resource. In: Crean K, Symes D, editors. *Fisheries management in crisis? Fishing news books*. Oxford: Blackwell Science, 1996. p. 87–91.
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- [10] Geheb K, Binns T. Fishing farmers or farming fishers? The quest for household income and nutritional security on the Kenyan shores of Lake Victoria. *African Affairs* 1997; 96:73–93.
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informed by equilibrium-based stock assessment methods. These management policies comprise three main sets of instruments and institutions [reviewed in 3]. Input controls limit access to fish stocks through measures like boat or operator licenses, restrictions on vessel capacity, closed seasons, or closed fishing zones. Technical measures restrict the efficiency or selectivity of fishing gears through devices such as minimum mesh size for nets and prohibition of certain types of gear. A third set of top-down instruments, prevalent in industrialised countries, set out to regulate the catch directly (output controls), through such devices as total allowable catches (TACs) and limits on permissible by-catch proportions in single species fisheries. These latter instruments are rarely, if ever, found in low-income developing countries due to the high cost and administrative unfeasibility of implementing them effectively, but they do impinge upon the activities of small-scale fishers exploiting high-value inshore fisheries in some developed countries.

Attempts to match catching capacity with resource productivity through a combination of state-imposed input, output and technical control measures have a high failure rate, which can partly be attributed to the high degree of short-term, unpredictable variability in fish stocks [16]. Top-down management instruments tend to be insufficiently responsive to trends and shocks. As institutions, they lack adaptability and resilience [40]. The complex, even chaotic, behaviour of fish stocks has led Wilson et al. [16] to suggest that there could never be sufficient information to manage fisheries on a numerical basis. Instead of controlling 'how many' fish are caught (e.g. by specifying TACs), they suggested that the best alternative was to develop fishing restraints that affect 'how, when and where, fish are caught', to ensure that core ecosystem functions that support fisheries productivity are preserved. Wilson et al. [16] reviewed examples of what they termed 'parametric management' from fisheries around the world and suggested that many 'traditional' management systems that had successfully sustained fisheries were based on such parametric controls, which include protection of spawning and nursery areas, limited access, closed seasons and size limits. These management measures are often based on local or indigenous knowledge [41].

Wilson et al.'s suggestions led to a spirited correspondence in this journal.⁶ The thrust of the criticisms suggested that such parametric measures were already part of the array of state-led fisheries management measures (being similar to some of the input controls

and technical measures) and were not in themselves sufficient to ensure fisheries sustainability, whether enforced by governments or fisherfolk themselves. Neither Wilson et al. [16] nor their critics considered that 'parametric management' could additionally incorporate responses to signals of resource scarcity that lie outside the relationship between fisher and fish, and that it is these responses (such as those given in Table 2) that could provide a means to limit fishing effort in times of resource scarcity.⁷

While management based on bio-economic equilibrium concepts was gradually introduced to tropical small-scale fisheries [43], fisheries development policies were designed to increase fisherfolks' incomes indirectly via subsidies to boats, gears and fuel, the creation of state trading organisations to stabilise or raise fish prices, and measures to improve marketing and to reduce wastage of fish in transit [44]. Many of these policies have subsequently fallen into disrepute in the era of market liberalisation, and, like many similar policies in the agricultural sphere, are being dismantled, often under pressure from the international financial institutions in the context of reform programmes.

There has always existed a paradox and tension between the two arms of fisheries policy, increasing efficiency and regulating the catch. Raising the efficiency of fishing effort, by for example, supplying artisanal fishers with improved boat designs, or subsidising credit for the purchase of outboard motors, or promoting nets made of more durable materials, will only increase incomes across all fishing families if the resource remains relatively under-exploited compared to the long-run sustainable catch. As soon as the catch rate approaches or exceeds this sustainable long run level, even given the various caveats about measurability and species substitutability and so on, then increased efficiency must at one and the same time mean reduced number of individuals or families involved in fishing. The alternative is that the same number of people stay in fishing but under-utilise their enhanced capacity to catch fish, thus making no gains in income, and incurring a social waste of resources in the idle capacity represented by their improved assets. These are the 'hard choices' in fisheries development [45].

Modernisation programmes can also undermine the type of adaptive responses to resource uncertainty described in Table 2. Promotion of increased specialisation through investment in more capital-intensive fishing

⁶Kesteven GL. 1995;19(3). 247–248; Fogarty MJ. 1995;19(5):437–444; Hilborn R, Gunderson D. 1996;20(1):87–89; Parsons LS, Maguire JJ. 1996;20(2):175–176; Wilson JA, Acheson J, Kleban P. 1996;20(5):429–438; Fogarty MJ, Hilborn R, Gunderson D. 1997;21(2):187–194.

⁷Another means to regulate fishing effort that specifically accounts for the importance of stock fluctuations is the so-called 'threshold' approach [42], where fishing effort (input) or catch (output) controls are applied in situations of resource scarcity to ensure that the fish stock biomass does not fall below some critical level. These need sophisticated monitoring of catch, effort and fish stock biomass and not likely to be relevant to the management of the types of fishery we discuss in this paper.

technologies tends to push part-time fishers into full-time operations simply to repay loans and to earn an adequate return on the increased investment [20, p. 196]. Increased dependency on fishing can mean that individuals find it harder to turn to non-fishing alternatives during periods of resource scarcity. This, in turn, can compromise resource sustainability.

What many analyses have also neglected to consider is that the level of incomes in fishing cannot be divorced from income levels in other parts of the economy, and particularly in occupations that fisherfolk might be in a position to enter in the event of a collapse in income from fish. In other words, the number of individuals or families engaged in fishing as a main occupation depends on the opportunity income available to them [46]. On the one hand, if fishing income rises above that for comparable trades in the rest of the economy, there will be an influx of new entrants that will drive income down.⁸ On the other hand, if incomes elsewhere in the economy rise, then individuals may leave fishing, or become part-time fishers, allowing those left behind to experience rising incomes.⁹ Therefore, much of the effort expended by fisheries departments to raise fisherfolks' incomes in the context of generally low incomes has reflected misplaced optimism about what can be done for a single sector taken in isolation from the rest of the economy.

Fisheries policy in developing countries has tended to view fishing as a full-time occupation taking place within a single, well-defined, economic sector. The same is also true of farming and forestry, and is reflected in the division of responsibilities at central government level between ministries or sub-sector departments within ministries. There is nothing unique to developing countries about this, since the same sectoral divisions occur worldwide, and are enshrined in everything from the way national accounts are compiled to the structure of public administration. However, this feature provides great scope for misunderstanding how people conduct their lives, and for pursuing policies that are rendered

irrelevant by the cross-sectoral livelihood strategies actually pursued by individuals and families.

3.2. *Livelihood diversity or resource dependency?*

Diversity is an important attribute of rural livelihoods in developing countries, and one that has tended to be ignored by policies that are sectorally based [25,48]. One of the very first things that a livelihoods approach uncovers is that fisherfolk, as indeed do most rural citizens in low-income countries, pursue diversified livelihood strategies. They do this for a number of very obvious reasons. Fishing is a high-risk occupation, and one prone to seasonal and cyclical fluctuations in stock size and location, some of which are highly unpredictable in occurrence. Diversification reduces the risk of livelihood failure by spreading it across more than one income source. It also helps to overcome the uneven use of assets (principally labour) caused by seasonality, to reduce vulnerability, to generate financial resources in the absence of credit markets, and it confers a host of other advantages in the presence of widespread market failures and uncertainties.

In the past, mobility of individuals between fishing and other activities has tended to be seen as a substitution between full-time occupations [47]. The policy concern has always been either about the risk of high inward mobility leading to over-exploitation of an open access resource, as classically laid out by Gordon [49], or about the lack of outward mobility in the event of diminishing returns to labour and other assets, or a collapse in the fishery for a particular species. Mobility out of fishing is evidently reduced the greater the amount of capital that is tied up in fishing assets and the more specialised are those assets, implying that they may not be widely transferable between different fisheries [50]. However, for most artisanal fisheries, and especially those in low-income countries, the assets tied up in fishing are not that great, and mobility is relatively high. Some of the reason for this is that part-time use of low technology fishing assets is a realistic alternative, in the event that an acceptable income cannot be achieved from fishing alone. Seen in this context, artisanal fishers' 'primitive' fishing gear may represent an adaptive strategy to match investment in fishing-related assets to a diverse livelihood, and, as was suggested above, intervention that encourages greater capital investment may inadvertently undermine this.

The livelihoods approach does not require mobility to mean substitution between full-time occupations. It accepts that individuals and families straddle sectors for good reasons, and it poses questions about the ease with which they can do this in a world that is preoccupied with sectoral policies. The pursuit of diverse livelihood strategies by fisherfolk potentially overturns many of the precepts upon which fisheries

⁸This process is of course not frictionless, since fishing requires familiarity with open water and skills that many individuals might consider would disbar them from entering the sector. Nevertheless, barriers to entry arguments can be overdrawn, and most evidence points to considerable mobility both into and out of artisanal fisheries sectors [47].

⁹Much is made in the popular literature about fishing being 'in the blood'—the result of generations of cultural heritage that separates fisherfolk from 'landlubbers'. Although there are some specialist fishing people, such as the boat-dwelling Bajau of the Sulu Archipelago, Indonesia, and the indigenous people of the Azuero Peninsula, Panama [13], the evidence assembled in this paper suggests that fishing part-time has been the historical norm, and that the full-time professional fisher is largely a product of 20th century industrial fishing culture, and therefore has little claim to status as a generations-old tradition. There is also evidence to suggest that high proportions of small-scale fishers in SE Asia would be willing to leave the fishery altogether in search of alternative work [10,23,47].

management policies are predicated. It is just possible that diversified livelihoods obviate the necessity for the vast array of top-down policy instruments that characterise most artisanal fisheries management. A low technology, opportunistic, fishery adjusts its behaviour to the available resource; if the resource declines then the fishing effort is scaled back and family resources turn to doing other things. The uncritical application of a fisheries management approach that is predicated on ever higher fishing technology in industrial countries may be quite inappropriate in most artisanal fisheries in low-income countries.

3.3. *Financing fisheries development*

Although livelihood diversity is frequently documented in the fisheries literature (even if its implications are rarely considered in fisheries management), there is one feature of rural livelihoods that has been consistently overlooked in fisheries sector analyses—the importance of the remittance economy. Even analyses of fishing communities that specifically highlight non-fishing sources of income assume “natural resource dependency” of livelihoods [20]. Studies of household incomes in rural areas of low income countries generate average figures demonstrating that between 40 and 60 per cent of rural incomes tend to originate from non-natural resource based sources (see, for example, [51]). Remittances from temporary, cyclical or permanent migrants are always important, and in southern Africa, for example, they can account for as much as 80 per cent of rural household incomes [35]. Remittances may be a significant source of capital for investment in fishing-related assets, but will only be invested when a better rate of return is expected than that from alternative sources. Remittances therefore potentially represent an appropriate and sustainable means of self-financing for fisheries development, given an institutional environment that enables or facilitates labour migration and the means by which to organise financial transfers.

More typically, government-borrowing and donor-funded credit schemes have been applied to provide capital for investment in small-scale fisheries. These have often been based on rigid repayment schedules that do not account for income variability from fishing. They may also be based on unrealistic expectations of the amount of investment a fishery can support while still generating sufficient returns to allow individual fishers to repay loans. These finance schemes contrast sharply with arrangements whereby local financiers purchase fishing assets and allow repayment levels by fishers to mirror their catch levels [5].¹⁰

¹⁰Interest rates on such flexible loans may be higher, leading to the common misconception that local financiers are inevitably ‘exploitative middlemen’.

3.4. *Community-based fisheries management*

Recognition of the problems of fisheries development in small-scale fisheries and limitations of centralised, state-led fisheries management has led to widespread policy support for the principle of decentralised management in fisheries as, somewhat belatedly, fisheries policy makers have got caught up in the emphasis on community and participation that has dominated rural development policy discussion since the 1980s [52, for review]. The policy debate in fisheries has also been influenced by the literature on common property resources, and the proposition that individuals or groups sharing common interests can create effective community-based natural resource management (CBNRM) regimes for such resources [53]. A community-based approach to fisheries management appears, therefore, to satisfy several different desirable goals. It places decision-making at a level that should ensure that local knowledge of the resource is brought into play; it ensures participation by fishing families themselves in decision-making processes and it lifts from overstretched governments the burden and cost of administrative functions that they are unable to discharge effectively.

This is all very well, but the community approach to fisheries management is predicated on some important assumptions that may not stand up to too much scrutiny in practical cases. It assumes that the “community” as a group of individuals or families with fishing-based livelihoods can be effectively defined; that village administrations in “fishing villages” are pre-occupied with the welfare of fisherfolk and the conservation of fish stocks rather than with other things (roads, tourism, beer parlours or whatever); and that territorial use rights, based on village location, are compatible with the behaviour of both the fisherfolk and the fish they endeavour to catch.

There are many instances where almost all these precepts are likely to be wrong. Although current fisheries policies¹¹ champion the role of community in bringing about development and resource conservation, the concept of ‘community’ is rarely defined or carefully examined by those concerned with resource use and management. It is assumed that if communities are involved in conservation, the benefits they receive will create incentives for them to become good stewards of the resource, “if only the state and the market would get out of the way” [54, p. 633].

Community is often seen in one of three ways: a spatial unit, a social structure, and a shared set of norms. All these definitions are problematic.

¹¹Notably the FAO Code of Conduct for Responsible Fisheries [54] that is now being adopted to guide many national fisheries policies in developing countries.

3.4.1. Geographically defined ‘communities’

It is the spatial view of ‘community’ that underlies some of the thinking on ‘Territorial Use Rights in Fisheries (TURFS; [12,56]). Ecologically, TURFS are most appropriate where boundaries of fishing areas are clearly defined (e.g. small lakes, coastal lagoons, coral reefs), fishery resources are sedentary (e.g. shellfish) and fishing gear is passive (e.g. pots, traps, weirs). They are obviously less suitable when fisheries are based on more mobile species, such as the coastal small-pelagic fish that are often the most significant marine resource consumed by low-income households in developing countries.

There is also a tendency to assume a link between territorial conception of community and successful resource management, which may not always be the case—some small, territorially contained groups do not protect or manage resources well, and some mobile, transnational groups manage them effectively [55].

Creating TURFS associated with individual fishing villages is a currently fashionable form of institution-building in fisheries development. However, temporary migration to places where fish are available is a prevalent feature of artisanal fisheries worldwide, and one that does not sit comfortably with the notion of territorial rights being based on resident populations in shoreline villages. Temporary fishing camps are a common sight in developing-country fisheries and seldom feature in accounts of ‘fishing communities’.

Fisheries development projects predicated on a static, geographical view of community may exclude migrants—in a fishery development programme in West Bengal, fishermen were required to live in the region of the co-operative to become a member. Even residents had difficulties participating because their mobile fishing strategies made it difficult to get to co-operative meetings [13].

The attempts to link fishing households to sea territories has parallels with the unsuccessful attempts to settle nomadic pastoralists and intensify land use in the variable production environments of the Sahel through the ‘*gestion terroir*’ approach [57]. The concept arose, as it appears to have done with TURFS in fisheries, with an image of sedentary populations living in stable village settings and deriving their livelihoods primarily from the exploitation of their *terroirs*. Painter et al. [57] use the term ‘action space’ to describe the geographical and temporal distribution of the combination of more or less viable options that smallholder agriculturists and pastoralists actually exploit as they pursue their livelihoods, showing that the ‘*terroir villageois*’ makes a relatively small and highly variable contribution to household viability. The livelihoods approach may lead to a similar reconceptualisation of many coastal TURFs.

3.4.2. The ‘community’ as a homogenous social structure

The assumption of communities as groups endowed with similar assets and incomes, living in households that possess common characteristics in relation to ethnicity, religion or caste is common. Such homogeneity is also assumed to further co-operative solutions, reduce hierarchical and conflictual interactions and promote better resource management. “Outside the community, conflicts prevail; within harmony reigns” [55]. Once again, all these assumptions can be challenged, and they certainly need to be validated before any practical attempts are made at supporting decentralised resource management. Our on-going research in fishing villages on Lake Malawi (see note 5) shows that ethnicity is often a critical issue in fishing villages, with those involved in fishing frequently being migrants from other areas, while long-term residents may be more interested in farming than fishing. In village decision-making processes dominated by resident non-fishing households, fishing interests may go unrepresented.

In much of the South Pacific, sea rights depend on social status, and use rights govern resource exploitation. Fisheries projects that are predicated on the assumption that control over fishing grounds and use rights are equally distributed are misguided:

To ... perceive fishing rights as being vested with village co-operatives, with each village ‘owning’ its adjacent fishing areas, and to give such village units some formal legal status would be to override fundamental social relationships whereby a primary rights-holder grants secondary use rights according to customary obligations of reciprocity

(Ruddle et al., [18]).

3.4.3. A ‘community’ as people having shared norms and common interests

As implied above, and as has been stated in other contexts, communities are often riven with differences of status, ethnicity, wealth and incomes [58] that make an implied coincidence of interests and goals quite dubious. Shared norms and common interests by community members (interests which may not in any case support resource conservation—[55]) come into being in relation to particular contextual factors, and do not remain static. They are therefore difficult to codify and enshrine in legal rights.

One of the advantages of the livelihoods approach is that it makes no assumptions about ‘community’. In this respect, it supports recent calls [55] to abandon the notion of the ‘mythic’ community in favour of a focus on institutions, conceptualised as sets of rules describing and prescribing human actions. Rather than trying to use concepts of territory, social structure or shared values, an institutional approach focuses on the ability of groups of people to create and enforce rules—rules

that are the product of social negotiation, economic and political forces. These institutions may or may not tally with notions of ‘community’, and may in fact be more likely to be the product of compromise between different actors or stakeholders [55]. In fisheries management initiatives, this implies a redirection of effort in support of existing local-level institutions, and away from attempts to create externally perceived ‘communities’.

4. Synthesis

The application of the livelihoods approach suggests that many of the precepts underlying conventional fisheries management may be wrong and can result in inappropriate or unnecessary policy. It cannot be assumed that the incomes of fisherfolk can be increased simply by improving the efficiency of their fishing effort. It cannot be assumed that artisanal fisheries are composed of full-time fishing families that are so inflexibly tied to the fishery for their survival that they are not mobile between sectors. When the diverse livelihoods of artisanal fisherfolk are properly taken into account it becomes apparent that fishing for many such families is an opportunistic endeavour, the effort devoted to which varies flexibly according to the gains that are made. Such behaviour is unlikely to decimate fish stocks, and requires a much lighter touch of regulation than the approach of orthodox fisheries management. Diversified livelihoods and geographical mobility may be beneficial to resource conservation and need policy support rather than restriction—“the management of fishing should be as ready to take full benefit of good years as to exercise restraint in poor years” [17, p. 73].

Charles [3, p. 326] argues that: “Solving the problem of a lack of livelihood diversity (economic diversification) is by no means simple. If it were, fishery-based economies would already have become diversified by now, in response to past fishery downturns”. This paper contends that such diversification has taken place at individual and household level, and indeed has been a characteristic of ‘sustainable’ fishery systems. Situations of lack of livelihood diversity may have arisen as a result of inappropriate fisheries management and development interventions. Recognising and supporting ‘occupational pluralism’ by careful analysis of the factors that currently constrain it would seem to be one productive direction for future fisheries management and development. It runs counter to an approach that seeks to ‘professionalise’ artisanal fishers.

Nor is community management a panacea in the many instances where the resource is not strongly defined territorially and where it fluctuates in volume according to poorly understood natural cycles as well as

to the effects of human activity. Community management is also based on a set of assumptions about the social homogeneity of fishing villages and the coincidence of people’s interest in fishing that need careful examining in practical cases. In particular, artisanal fisherfolk are often temporary or long-term migrants in the coastal villages from which they engage in fishing. They may be a different ethnic group from the resident villagers, and they may have little real purchase on village decision-making despite the rhetoric of community and participation. Current moves towards support for developing appropriate fishery management institutions based on existing structures are welcome, but are likely to take some time to filter through to management agencies that are only just getting used to devolving responsibility to ‘communities’.

One of the benefits of the recent shift in emphasis, from top-down stock assessment driven approaches to participatory management, is that those involved in fisheries management and policy are learning much more about fisherfolk. Livelihoods analysis further extends the scope for making policy and management more supportive of small-scale fisherfolk in low-income countries that are attempting, through their livelihood activities, to find a route out of poverty.

5. Conclusions

Having attempted to highlight what we believe is wrong with current approaches to fisheries management and development, we conclude by offering some alternative suggestions, or points for discussion, that emerge from a livelihoods perspective on small-scale fisheries management and development:

- Livelihood diversification is a feature of many fishing communities. Policy and management that encourages or enables part-time fishing is preferable to approaches that seek to ‘professionalise’ small-scale fishers and ban part-timers.
- Development in rural areas where fishing is important may not be best served by intervention to increase fishing incomes, but rather to support complementary household activities. This does not mean encouraging people to leave the fishery altogether, as substituting one insecure income-source for another is no solution. Encouraging alternative livelihood sources raises the opportunity income of fishing, with potential conservation and economic benefits.
- Geographical mobility is necessary to sustain catches on mobile or fluctuating fish stocks. Mobility can also be beneficial to stock conservation in that it enables fishers to move away from locally depleted resources.

When small-scale fisherfolk are operating outside their home area, they are generally resident in and landing to other ports or beaches in the vicinity. This generally conveys economic benefits to the area they are visiting. Existing arrangements for reciprocal access can be encouraged, but where stock conservation becomes an issue, the power of ports to levy landing or berthing fees can be used to adjust incentives for other vessels to fish in that area or not.

- The remittance economy is important in rural areas, and whether or not remittances are invested in fishing can act to regulate capitalisation in fisheries. Support for financial transfer mechanisms, together with support for flexible loans built on existing local financing schemes, can provide a means of appropriate capital investment in fisheries development.
- Within the fisheries sector, the FAO Code of Conduct for Responsible Fisheries, with its provisions to protect small-scale fishers' livelihoods from conflict with larger-scale commercial interests, provides the necessary framework for maintaining or enlarging small-scale fisherfolks' 'action space'. Many of its other provisions related to use of non-destructive fishing gear, withdrawal of subsidies for commercial fisheries etc, are also supportive of the sustainability of small-scale fisheries.
- A livelihoods approach does not imply that all technology development in fisheries is bad. Appropriate technologies are likely to include those related to fishing techniques that reduce by-catch, more efficient processing and storage and improved vessel safety/seaworthiness. Livelihoods analysis can help to target technologies that fit within peoples' constraints, opportunities and investment strategies.
- A livelihoods approach, emphasising the removal of barriers to entry and to mobility does not imply a *laissez-faire* approach to management. Institutions to regulate access to resources are still important, it is just that they do not necessarily take the form of fixed fishing territories and fixed licence numbers calculated on the basis of taking an economically optimal catch from a static equilibrium fish stock.
- Fisheries sector development analyses have tended to focus on what small-scale fisherfolk do not have—access to infrastructure, finance and technology—rather than what they do have—adaptable and flexible income-generating strategies, resilient resource management institutions, knowledge, skill and social capital. The key to sustainable fisheries management and development is to facilitate small-scale fisherfolk to find their own routes out of poverty by building on their existing capital and capabilities.

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